comes relevant. Here, the frequency of data errors at the receiving data microprocessor 48 is determined and employed at block 144 to adjust the EDC packet to provide larger or smaller packets in the manner described in connection with FIG. 2. Then this portion of the program is exited at 146.

The operation of the microprocessors 32 and 48 during the reception of data, evaluation of data errors and transmission of acknowledgment signals has been fully described previously. Since this operation is similar to that which occurs with wire line and other data transmission systems, it will be readily understood by those having ordinary skill in the art, and the instructions for the microprocessors are disclosed in detail by the appendixed program.

INDUSTRIAL APPLICABILITY

The cellular telephone data communication system of the present invention provides a cooperating mobile data programming interface and static data programming interface which operate together to perform the functions necessary to control errors in an efficient way to permit data transmission in the limited voice band available when using cellular telephone technology. Since both interfaces incorporate a microprocessor with independent firmware storage capabilities, a flexible system is provided wherein various computer control devices can execute the functions provided by a cellular telephone system. At the same time, the unit permits the cellular telephone system to be employed for the conventional audio transmissions which the system was designed to handle.

I claim:

1. A method for transmitting data from a transmitting station over a cellular telephone system to a receiving station by means of a modem connected to said cellular telephone system which is operative in an activated state to modulate a carrier signal for said cellular telephone system with a data signal, said method including the steps of placing said modem in the activated state, providing a data signal to said activated modem, maintaining said modem in the activated state for a predetermined time period after a loss of said carrier signal before permitting said modem to deactivate, and causing said modem to remain in said activated state after the loss of said carrier signal if said carrier signal resumes within said predetermined time period.

2. The method of claim 1 which includes adding an error control correction data format to said data signal before providing said data signal to said modem.

3. The method of claim 1 which includes repetitively providing a unique data byte to said modem during a break in said data signal.

4. The method of claim 2 wherein the addition of said error control correction format involves dividing data to be transmitted into a plurality of data packets, each data packet including a plurality of data words, the number of data words in a data packet determining the size of the data packet, providing said data signal to said modem for transmission to said receiving station, examining the data words in each received data packet at the receiving station for error and determining which data words are acceptable, transmitting an acknowledgment signal to the transmitting station for each acceptable data word, determining from the transmitted acknowledgment signals which data packets were received with unacceptable errors and retransmitting said unacceptable data packets, and determining the frequency of error in said received data packets from said acknowledgment signals and adjusting the size of subsequent data packets to be transmitted in accordance with said error frequency.

5. The method of claim 4 which includes decreasing the size of subsequent data packets to be transmitted as the frequency of error in received data packets increases and increasing the packet size of subsequent data packets to be transmitted as the frequency of error in received data packets decreases.

6. The method of claim 4 which includes sensing a complete loss of said carrier signal for a predetermined period at said transmitting station and initiating said predetermined time period in response to said loss to maintain said modem in the activated state.

7. The method of claim 6 which includes causing said modem to disconnect and terminate transmission to said receiving station of all data packets if the signal is not resumed within said predetermined time period.

8. The method of claim 7 which includes operating said modem without a scrambler polynomial and continuously changing said data signal provided to said modem for modem synchronization.

9. The method of claim 8 which includes repetitively providing a unique data byte to said modem during a break in said data signal to prevent the modem from entering a static condition.

10. A method for transmitting data between a transmitting station and a receiving station which includes dividing data to be transmitted into a plurality of data packets, each data packet including a plurality of data words, the number of data words in a data packet determining the size of the data packet, transmitting said data packets to the receiving station, examining the data words in each received data packet for error and determining which data words are acceptable, transmitting an acknowledgment signal to the transmitting station for each acceptable data word, determining from the transmitted acknowledgment signals which data packets were received with unacceptable errors and retransmitting said unacceptable data packets, and determining the frequency of error in said received data packets from said acknowledgment signals and adjusting the size of subsequent data packets to be transmitted in accordance with said error frequency.

11. The method of claim 10 which includes decreasing the size of subsequent data packets to be transmitted as the frequency of error in received data packets increases and increasing the packet size of subsequent data packets to be transmitted as the frequency of error in received data packets decrease.

12. A signal processing interface for communicating data from a data source over a cellular telephone system to a receiving means via a cellular telephone radio carrier signal comprising processing means connected to receive data from said data source, said processing means operating to form said data into a data signal format to be transmitted as a data signal, the data signal format including blocks of data, at least one acknowledgment signal to be retransmitted by said receiving means back to said processing means upon receipt of each of said data blocks, cellular telephone transmission means operative upon receipt of said data signal format to transmit said data signal to said receiving means, and modem means connected to said signal processing means and said cellular telephone transmission means and operative to receive said data signal containing said data signal format from said processing means and to

provide said data signal for transmission to said cellular telephone transmission means, said modem means being operative to disconnect from said cellular telephone transmission means in response to a disconnect signal and inoperative to disconnect in response to a loss of said cellular telephone radio carrier signal, said processing means operating to provide a disconnect signal to said modem means when a delay period subsequent to a loss of said cellular telephone radio carrier signal has elapsed without the resumption of said cellular telephone radio carrier signal.

13. The signal processing interface of claim 12 wherein said modem means operates without a scrambler polynomial, said processing means operating to continuously change said data signal to provide synchronization for said modem means.

14. The signal processing interface of claim 13 wherein said processing means operates in response to a break in said data to repetitively provide a unique data byte to said modem means for the duration of said break in the data.

15. A cellular telephone data communication system for communicating data from a data source over a cellular telephone system having a mobile transceiver unit operative to transmit and receive cellular telephone signals and a plurality of fixed transceiver units connected to transmit signals over a conventional telephone line system comprising a mobile signal processing interface means connected to said mobile transceiver unit and operative to communicate data from a data source to said mobile transceiver unit for transmission via a cellular telephone radio carrier signal or to receive a transmitted data signal from said mobile transceiver unit, and a static signal processing interface means connected to said conventional telephone line system and operative to communicate data from a data source over said conventional telephone line system to one of said fixed transceiver units for transmission via a cellular telephone radio carrier signal to said mobile unit or to receive a transmitted data signal via said conventional telephone line system, each said mobile signal processing interface means and static signal processing interface means being operative in a transmitting or receiving mode while the other operates in the opposite mode and each including signal processing and control means connected to receive data from a respective data source in the transmitting mode, said signal processing and control means also being operative in the receiving mode to receive a data signal from the associated mobile transceiver unit or associated conventional telephone line system, and modem means connected to said signal processing and control means, the signal processing and control means of the mobile or static signal processing interface means operating in the transmitting mode being operative to receive data from the associated data source and to form said data into a data signal format to be transmitted as a data signal to the modem means connected thereto, said modem means being operative to disconnect in response to a disconnect control signal and inoperative to disconnect in response to a loss of said cellular telephone radio carrier signal, the signal processing and control means operating to provide a disconnect control signal to the modem means connected thereto when a delay period subsequent to a loss of said radio carrier signal has elapsed without the resumption of said telephone radio carrier signal.

16. The cellular telephone data communication system of claim 15 wherein the data signal format is formed by the signal processing and control means for the mobile or static signal processing interface means operating in the transmitting mode by dividing data to be transmitted into a plurality of data packets, each data packet including a plurality of data words, the number of data words in a data packet determining the size of the data packet, the signal processing and control means for the mobile or static signal processing interface means operating in the receiving mode being operative to receive and examine the data words in each transmitted data packet for error to determine which data words are acceptable and to transmit an acknowledgement signal for each acceptable data word to the transmitting mobile or static signal processing interface means, the signal processing and control means for the transmitting mobile or static signal processing interface means operating to receive and determine the frequency of error in said received data packets from said acknowlegment signals and to adjust the size of subsequent data packets to be transmitted in accordance with said error frequencey.

17. The cellular telephone data communication system of claim 16 wherein the signal processing and control means for the transmitting mobile or static signal processing interface means operates to control the size of subsequent data packets inversely to the error frequency detected thereby.

18. A data processing interface for operation in a transmitting mode for transmitting data from a data source over a cellular telephone system to a receiving means via a cellular telephone radio carrier signal comprising processing and control means connected to receive data from said data source, said processing and control means operating to form said data into a data signal format to be transmitted as a data signal, said data signal format including a plurality of data packets, each said data packet including a number of data and control words, the number of words in a data packet determining the size of the data packet, each said data packet including an error control correction data format having at least one acknowledgement section, the acknowledgement section adapted to be retransmitted by said receiving means as an acknowledgment signal when an acceptable data packet is received by said receiving means, and modem means connected to said processing and control means to receive said data signal therfrom, said modem means being operable to modulate said cellular telephone radio carrier signal with said data signal and to provide said modulated signal to said cellular telephone system, said modem means receiving the acknowledgment signals transmitted by the receiving means and operating to provide such acknowledgment signals to said processing and control means, the processing and control means determining from said acknowledgment signals the frequency of error in the received data packets and adjusting the size of subsequent data packets in the data signal in accordance with said error frequency.

19. The data processing interface of claim 18 wherein said processing and control means determines from the acknowledgment signals which data packets were received with unacceptable errors and provides said data packets to said modem means for retransmission by said cellular telephone system.

20. The data processing interface of claim 19 wherein said modem means operates without a scrambler polynomial, said processing and control means operating to

continuously change the data signal to provide synchronization for said modem means.

21. The data processing interface of claim 19 wherein said modem means operates without a scrambler polynomial, said processing and control means operating in response to a break in the data from said data source to repetitively provide a unique data byte to said modem means for the duration of said break in the data.

22. The data processing interface of claim 19 wherein said modem means is operative to disconnect from said cellular telephone system in response to a disconnect signal and inoperative to disconnect in response to a loss of a cellular telephone radio carrier signal, said processing and control means operating to provide a disconnect signal to said modem means when a delay period subsequent to a loss of said cellular radio carrier signal has elapsed without the resumption of said cellular telephone radio carrier signal.

23. The data processing interface of claim 22 which is operative in a receiving mode to receive a data signal transmitted by said cellular telephone system, said

modem means receiving the data signal from said cellular telephone system and providing said data signal to said processing and control means, the processing and control means operating to examine the data words in each received data packet for error to identify acceptable data words and providing an acknowledgment signal to said cellular telephone system for each acceptable data word, the processing and control means operating to remove the error control correction data format from said data section.

24. The data processing interface of claim 23 wherein said modem means operates without a scrambler polynomial, said processing and control means operating to continuously change said data signal to provide synchronization for said modem means.

25. The data processing interface of claim 24 wherein said processing and control means operates in response to a break in the data from said data source to repetitively provide a unique data byte to said modem means for the duration of the break in said data.

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